

1 What is claimed is:

2 1. A device for generating a downward stream of molten metal, the device including:

3 (a) a drive source;

4 (b) a drive shaft having a first end and a second end, the first end connected to the
5 drive source; and

6 (c) an impeller connected to the second end of the drive shaft, the impeller having
7 two or more outwardly extending blades, at least one blade including a portion
8 that directs molten metal at least partially downward.

1 2. The device of claim 1 wherein the impeller has four blades.

1 3. The device of claim 1 wherein a connective portion is formed in the impeller, the
2 connective portion connecting the impeller to the drive shaft, the connective portion
3 comprising a tapered, nonthreaded bore extending through the impeller.

1 4. The device of claim 3 which further includes a nut and wherein the second end of the
2 drive shaft has a threaded section that is positioned beneath the impeller; the nut being
3 threaded onto the threaded section to connect the impeller to the drive shaft.

4 5. The device of claim 1 wherein the portion that directs molten metal at least partially
5 downward is an angled surface.

6 6. The device of claim 1 wherein each blade includes a portion that directs molten metal at
7 least partially downward.

1 7. The device of claim 1 wherein the impeller has an overall length of at least 28".

2 8. The device of claim 2 wherein the impeller has an overall length of at least 28" and an
3 overall width of at least 28".

4 9. The device of claim 1 wherein each blade has a height of between 6" and 7".

1 10. The device of claim 5 wherein the angled surface is formed at a 45° angle.

1 11. A device for melting scrap metal, the device comprising:

2 (a) a vessel containing molten metal; and

- 3 (b) a scrap melter positioned in the vessel, the scrap melter comprising:
- 4 (i) a drive source;
- 5 (ii) a drive shaft having an first end and a second end, the first end being
- 6 connected to the drive source; and
- 7 (iii) an impeller connected to the second end of the drive shaft, the impeller
- 8 having two or more outwardly extending blades, at least one of the blades
- 9 including a portion that directs molten metal at least partially downward.
- 1 12. The device of claim 11 that further includes a circulation pump positioned in the vessel.
- 1 13. The device of claim 11 wherein the portion that directs molten metal at least partially
- 2 downward is an angled surface.
- 3 14. The device of claim 13 wherein the angled surface is formed at a 45° angle.
- 1 15. The device of claim 11 wherein the impeller has four blades.
- 1 16. The device of claim 15 wherein the impeller further includes a hub and each blade
- 2 extends outward from the hub by at least 10".
- 3 17. The device of claim 11 wherein each blade has a height between 6" and 7".
- 4 18. The device of claim 11 wherein the vessel has two compartments.
- 1 19. An impeller for use in a molten metal bath, the impeller comprising:
- 2 (a) means for connecting the impeller to a shaft; and
- 3 (b) means for generating a flow of molten metal.
- 1 20. The impeller of claim 19 wherein the means for connecting is a tapered, nonthreaded
- 2 bore extending through the impeller.
- 1 21. The impeller of claim 19 wherein the means for generating a flow of molten metal is two
- 2 or more blades formed on the impeller and extending outwardly from a hub, at least one
- 3 of the blades having a portion for directing molten metal at least partially downward.
- 1 22. The impeller of claim 21 wherein there are four blades and the impeller further includes a
- 2 hub.

1 23. The impeller of claim 21 wherein at least one of the portions for directing molten metal at
2 least partially downward is an angled surface.

1 24. The impeller of claim 22 wherein each of the blades extends outward from the hub by at
2 least ten inches.

1 25. A drive shaft used in a device for displacing molten metal, the drive shaft comprising:

2 (a) a first end; and

3 (b) a second end, the second end configured to connect to an impeller and having a
4 tapered portion and a threaded portion juxtaposed the tapered portion

5 whereby the threaded portion is positioned beneath the impeller when the drive shaft is
6 connected to the impeller. *NAS*

1 26. A device for generating a downward stream of molten metal, the device including:

2 (c) a drive source;

3 (d) a drive shaft having a first end and a second end, the first end connected to the
4 drive source; and

5 (e) an impeller connected to the second end of the drive shaft, the impeller having
6 two or more outwardly extending blades, at least one blade including a vertical
7 face that directs molten metal at outward from the impeller.

1 27. The device of claim 26 wherein the impeller has four blades.

1 28. The impeller of claim 27 wherein the impeller is in the shape of a cross.

1 29. The device of claim 26 wherein the vertical face of each blade is at least 6 inches in
2 height.

1 30. The device of claim 26 wherein the vertical face of each blade is more than 4 inches in
2 height.

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